In the Specification

Please amend the indicated paragraphs as follows:

[0005] Processing systems (*e.g.*, cluster tools) have also increased in size to accommodate processing such large ~~area~~ substrates. For example, the internal diameter of a transfer chamber utilized to move such large substrates between processing chambers in a typical cluster tool has increased from about 80 to about 135 inches to accommodate the substrate size. Thus, the cost associated with tooling configured to process large area substrates continues to escalate dramatically.

[0014] Figure 2B is a sectional view of one embodiment of a ~~coat~~ coating station;

[0017] Figures 5-13 depict a film stack in various processing stages of the method depicted in the flow diagram of ~~Figured~~ Figure 4; and

[0020] Figure 1 depicts one embodiment of a semiconductor processing system or cluster tool 100 configured for *in-situ* processing of film stacks (*i.e.*, without removal of the substrate from the tool) comprising different materials formed on large area substrates (*e.g.*, substrates having a device side surface area of at least 0.25 square meters). The exemplary processing tool 100 generally includes a transfer chamber 102 circumscribed by one or more processing chambers 104A-E, a factory interface 110, one or more load lock chambers 106 and a post etch residual removal station 142. The processing tool 100 may optionally include a coating station ~~station~~ 140. In the embodiment depicted in Figure 1, one load lock chamber 106 is disposed between the transfer chamber 102 and the factory interface 110 to facilitate substrate transfer between a vacuum environment maintained in the transfer chamber 102 and a substantially ambient environment maintained in the factory interface 110. A

transfer robot 108 is centrally disposed in the transfer chamber 102 to move substrates between the chambers ~~104~~ 104A-E, 106. One example of a processing system which may be adapted to benefit from the invention is a 25K PECVD processing system available from AKT, Inc., a division of Applied Materials, Inc., located in Santa Clara, California. Although a method and apparatus for in-situ etching of a film stack is described herein with reference to the exemplary processing tool 100, it is contemplated that the invention may be adapted and practiced in other processing systems having different configurations. For example, it is contemplated that the system 100 may be comprised of a plurality of processing regions within a single chamber.

[0026] The processing head 220 generally includes a vacuum nozzle 222, a spray nozzle 224 and a gas delivery nozzle ~~206~~ 226. The spray nozzle 224 is coupled to a fluid source 230. The spray nozzle 224 is adapted to direct a stream of fluid suitable for removing etch residual material from the etch process from the substrate ~~support~~. In one embodiment, the fluid source 230 provides deionized water to the spray nozzle 224.

[0033] The processing head ~~220~~ 270 generally includes a spray nozzle 274. The spray nozzle 274 is coupled to a fluid source 280. The spray nozzle 274 is adapted to direct a stream of fluid suitable for coating the etched structure formed on the substrate with a passivation coating, for example, an organic film. The scanning motion provided to the processing head ~~220~~ 270, optionally coupled with the rotating substrate, allows the coating to be applied uniformly over the substrate.

[0034] Returning to Figure 1, the transfer chamber 102 is fabricated from a structural material suitable for use with process and/or cleaning chemistries, for example, an aluminum or steel alloy. In one embodiment, the transfer chamber 102 is fabricated from a single piece of aluminum alloy. The transfer chamber 102 defines an evacuable interior volume 128 through which substrates are transferred between the processing chambers ~~104~~ <u>104A-E</u> coupled to the exterior of the transfer chamber 102. A pumping system (not shown) is coupled to the transfer chamber 102 through a vacuum port 126 disposed on the chamber floor to maintain vacuum within the transfer chamber 102. In one embodiment, the pumping system includes a roughing pump coupled in tandem to a turbomolecular or a cryogenic pump.

[0039] Figure 3 is a cross sectional view of one embodiment of processing chamber ~~104A~~ <u>104E</u>, which is configured as a plasma enhanced processing chamber 300. The processing chamber 300 may be configured to perform etching and/or chemical vapor deposition processes.

[0042] The walls 306 support a lid assembly 310 that contains a pumping plenum 314 that couples the process volume 312 to an exhaust port <u>360</u> (that includes various pumping components, not shown). The pumping plenum 314 is coupled through ~~an~~ <u>the</u> exhaust port ~~362~~ <u>360</u> to a pumping system ~~360~~ <u>362</u>. The pumping plenum 314 is utilized to channel gases and processing by-products uniformly from the process volume 312 and out of the chamber body 302. It is contemplated that one or more exhaust ports may be alternatively disposed in another portion of the processing chamber, for example through the chamber walls 306 or bottom 308, with or without use of a pumping plenum. For low pressure applications, one or more turbo dry pump may be used to achieve the required process pressure.

[0047] The substrate support assembly 338 generally is grounded such that RF power supplied by a power source 322 to a gas distribution plate assembly 318 positioned between the lid assembly 310 and substrate support assembly 338 (or other electrode positioned within or near the lid assembly of the chamber) may excite gases present in the process volume 312 between the substrate support assembly 338 and the distribution plate assembly 318. The distribution plate assembly 318 generally has a central gas permeable section disposed over an area of at least 0.25 square meters to promote uniform flow of gas towards the substrate. The RF power from the power source 322 is generally selected commensurate with the size of the substrate to drive the chemical vapor deposition and/or etch process. Generally, the power source 322 is suitable for providing about 1,000 to about 30,000 Watts at a frequency of about 13.56 mHz to the gas distribution plate assembly 318. A matching circuit ~~352~~ (not shown) is provided between the power source 322 and the gas distribution plate assembly 318 to efficiently couple power therebetween. It is contemplated that greater power requirements may be required to process larger substrates in the future. Alternatively, the power can be applied from bottom substrate support plate. In this case, the ground will be made on the gas distribution plate. In another embodiment, both the bottom substrate support plate and the showerhead may be powered. In yet another embodiment, RF power may be provided in more than one frequency.

[0052] The lid assembly 310 typically includes an entry port ~~380~~ 330 through which process gases provided by the gas delivery system 304 are introduced into the chamber body 302. The gas delivery system 304 includes central gas delivery line 380 coupled at a first end to the entry port 380 and teed at a second end between a remote plasma source 384 and a gas panel 386.

[0055] The remote plasma source 384 utilizes plasma to generate radicals of a first process gas remotely from the chamber ~~200~~ 300, thereby isolating the substrate 112 from the high energy and temperature associated with radical generation and preventing damage to devices formed on the substrate 112. Moreover, the remote plasma source 384 allows greater process flexibility by facilitating higher processing temperatures within the chamber, thereby allowing processes to be performed on substrates having photoresist and other low temperature layers disposed thereon that conventional higher temperature processes would destroy, alter, damage and/or remove.

[0060] Figure 5 depicts one embodiment of the film stack 500A disposed on the glass substrate 112. The film stack 500 includes a gate metal layer 502 disposed between a gate insulation layer 520 and the glass substrate 112. A semiconductive layer is disposed over the gate insulation layer 520. In one embodiment, the semiconductive layer includes one or more silicon layers. In the embodiment depicted in Figure 5, the semiconductive layer is an amorphous silicon (a-silicon) layer 504 disposed over the gate insulation layer 520 and a N+/a-silicon layer 506 is disposed on the a-silicon layer 504. A second metal layer 508 is disposed on the N+/a-silicon layer 506. A patterned photoresist (resist) layer 510 is disposed on a portion of the second metal layer 508 overlying the gate metal layer 502. The photoresist layer 510 includes a thinner section 512 substantially centered over the gate metal layer 502 disposed between thicker sections 514. This type of film stack is used for 4-mask processing. One method for 4-mask processing is described by C.W. Kim et al., SID 200 Digest, paper no. 42.1, p. 1006 ~~(2000))~~ (2000). This invention intends to completes all the etching steps in one chamber. Materials suitable for the gate metal layer 502 include aluminum, aluminum alloys, chromium, molybdenum, titanium, and combinations thereof. Materials suitable for the gate insulation layer 520 include dielectric materials, such as SiN, SiO_x, among others. In one embodiment, the gate insulation layer 520 is SiN_x. The subscript X, as used herein, represents a positive integer. Materials suitable for the second metal layer 508 include

aluminum, aluminum alloys, chromium, molybdenum, titanium, and combinations thereof.